PCT/US01/40017

X ⇒ 1-3, 24

DERWENT-ACC-NO: 1999-233441

DERWENT-WEEK: 199920

TITLE: Loop and hook fastener for disposable diaper - has fiber layer used as connection portion formed with many projecting portions

PATENT-ASSIGNEE: DAIWABO CO LTD[DAIW]

PRIORITY-DATA: 1997JP-0227284 (August 7, 1997)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 11061624 A	March 5, 1999	N/A	009	D04H 011/08

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP 11061624A	N/A		
1997JP-0227284		August 7, 1997	

INT-CL (IPC): A44B018/00, D04H003/10 , D04H011/08

ABSTRACTED-PUB-NO: JP 11061624A

BASIC-ABSTRACT:

NOVELTY - A heat bonded non-woven fabric fiber layer (3) with considerable amounts of raised surface material has a small number of adhesion portions and fractured portion is unified with a layer of non-woven fabric layer (2) by tangling. The fiber layer (3) forms the connection portion with moving fine projecting portions (5).

USE - For disposable goods like disposable diapers.

ADVANTAGE - Offers low weight loop and hook fastener fabric, with high peeling strength.

DESCRIPTION OF DRAWING(S) - The figure shows sectional view of fastener. (2,3) Fiber layers; (5) Projecting portions.

CHOSEN-DRAWING: Dwg.4/10

TITLE-TERMS: LOOP HOOK FASTEN DISPOSABLE DIAPER LAYER CONNECT PORTION FORMING PROJECT PORTION

DERWENT-CLASS: D22 F07 P23

CPI-CODES: D09-C03; F04-C01; F04-C04;

SECONDARY-ACC-NO:
CPI Secondary Accession Numbers: C1999-069360
Non-CPI Secondary Accession Numbers: N1999-172792

PAT-NO: JP411061624A

DOCUMENT-IDENTIFIER: JP 11061624 A

TITLE: HOOK-AND-LOOP FASTENER FEMALE MATERIAL EXCELLENT IN PEELING STRENGTH AND ITS PRODUCTION

PUBN-DATE: March 5, 1999

INVENTOR-INFORMATION:
NAME
MAKIHARA, HIROKO

ASSIGNEE-INFORMATION:
NAME COUNTRY
DAIWABO CO LTD N/A

APPL-NO: JP09227284

APPL-DATE: August 7, 1997

INT-CL (IPC): D04H011/08, A44B018/00 , D04H003/10

ABSTRACT:

PROBLEM TO BE SOLVED: To obtain a hook-and-loop fastener female material free from the deterioration of an engaging force, even when repeatedly used for the engagement and disengagement with a male material, improved in operability and suitable for disposable commodities and the like by integrally laminating the specific second fiber layer to the surface of the first fiber layer comprising a thin fiber web.

SOLUTION: This hook-and-loop fastener female material is obtained by

laminating the second fiber layer 3 to at least one surface of the first fiber layer 2 comprising a thin fiber web and subsequently jetting a high pressure columnar water flow to the laminate to integrate both the fiber layers. The second fiber layer 3 comprises a highly fuzzy, thermally fused non-woven fabric wherein small portions of a fiber group constituting the thermally fused non-woven fabric are broken and/or small portions of the fused portions between the adjacent fibers of the fiber group are peeled. Both the fiber layers 2, 3 are preferably integrated and subsequently thermally treated to shrink the first fiber layer 2, thus forming many short row-like projections 5 in the second fiber layer 3. A fiber layer containing thermally shrinkable fibers having the maximum thermal shrinkage degree of ≥50% in an amount of ≥30 wt.% is preferably used for the first fiber layer 2.

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（A）　(11)特許出願公開番号

特開平11－61624

(43)公開日　平成11年(1999)３月５日

(51)Int.Cl.[6]	識別記号	ＦＩ	
Ｄ０４Ｈ　11/08		Ｄ０４Ｈ　11/08	
Ａ４４Ｂ　18/00		Ａ４４Ｂ　18/00	
Ｄ０４Ｈ　3/10		Ｄ０４Ｈ　3/10	Ｂ

審査請求　未請求　請求項の数10　ＦＤ　（全９頁）

(21)出願番号　特願平9－227284

(22)出願日　平成９年(1997)８月７日

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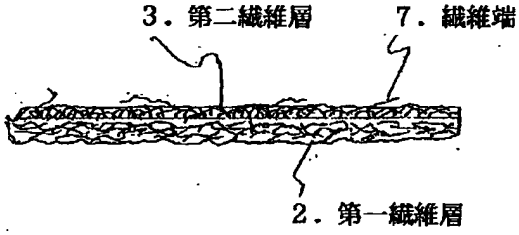
(54)【発明の名称】　剥離強力に優れた面ファスナー雌材及びその製造方法

(57)【要約】

【課題】　低目付であっても剥離強力の優れた面ファスナー雌材を提供する。

【解決手段】　熱接着不織布を構成する繊維群のうちの少数部分が破断、接着部分が剥離している不織布を係合部とし、これを基材としての不織布を高圧柱状水流で一体化した面ファスナー雌材であり、雄材のフックが係合部内に容易に侵入するので係合に寄与するフックが多く剥離強力が大きな面ファスナーが得られる。基材の不織布に熱収縮繊維を用いて面収縮させ、係合部に細かい凸部を多数形成すると一層剥離強力が増す。



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【特許請求の範囲】

【請求項１】　第一繊維層と第二繊維層とが繊維同士の交絡により一体化されてなる不織布において、第二繊維層は熱接着不織布であり該熱接着不織布を構成する繊維群のうちの少数部分が破断し、及び／又は繊維群の隣接する繊維間の接着部分のうちの少数部分が剥離している毛羽の多い不織布であり、第二繊維層を係合部として使用することを特徴とする面ファスナー雄材。

【請求項２】　第二繊維層は短い畝状の多数の凹凸をもつ請求項１記載の面ファスナー雄材。

【請求項３】　第一繊維層と第二繊維層とが繊維同士の交絡により一体化されてなる不織布において、交絡部が筋状に存在し、かつ交絡部以外の部分の第二繊維層は盛り上がった連続する畝部を形成している請求項１記載の面ファスナー雄材。

【請求項４】　盛り上がった連続する畝部上に該畝部と直交する方向を長手とする短い畝状の多数の凹凸をもつ請求項３記載の面ファスナー雄材。

【請求項５】　第二繊維層の熱接着不織布はスパンボンド不織布もしくはメルトブロー不織布である請求項１～４いずれかに記載の面ファスナー雄材。

【請求項６】　第一繊維層は熱により収縮する性質を有する繊維層であり、第二繊維層は第一繊維層が収縮する温度より高い収縮開始温度をもつ繊維層である請求項２または４に記載の面ファスナー雄材。

【請求項７】　繊維の薄層ウェブである第一繊維層の少なくとも片面に、熱接着不織布であり該熱接着不織布を構成する繊維群のうちの少数部分が破断し、及び／又は繊維群の隣接する繊維間の接着部分のうちの少数部分が剥離している毛羽の多い不織布である第二繊維層を積層し、これに高圧柱状水流を噴射して、両繊維層を一体化させることを特徴とする面ファスナー雄材の製造方法。

【請求項８】　熱により収縮する性質を有する第一繊維層の少なくとも片面に、第一繊維層が収縮する温度では実質的に収縮しない熱接着不織布である第二繊維層を積層し、これに高圧柱状水流を噴射して、両繊維層を一体化させた後、加熱処理を施すことにより、第一繊維層を収縮させ、第二繊維層に、短い畝状の多数の凸部を形成させることを特徴とする面ファスナー雄材の製造方法。

【請求項９】　熱により収縮する性質を有する第一繊維層の少なくとも片面に、第一繊維層が収縮する温度では実質的に収縮しない熱接着不織布である第二繊維層を積層し、これに高圧柱状水流を筋状に噴射して、両繊維層を一体化させるとともに筋状の交絡部の間を盛り上がった連続する畝部とした後、加熱処理を施すことにより、第一繊維層を収縮させ、該畝部上に畝部と直交する方向を長手とする短い多数の凹凸を形成させることを特徴とする面ファスナー雄材の製造方法。

【請求項１０】　第一繊維層は、最大熱収縮率５０％以上である熱収縮繊維を３０重量％以上含む繊維層を使用する請求項８または９に記載の面ファスナー雄材の製造方法。

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【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、使用にあたり雄材との剥離強力に優れた面ファスナー雄材及びその製造方法に関するものである。

【０００２】

【従来の技術】従来より、スパンボンド不織布又はメルトブロー不織布のような熱接着不織布を係合部としこれを他の不織布と一体化した面ファスナー雄材が知られている。熱接着不織布は各繊維が相互に接着されているため、繰り返し着脱される面ファスナーとして使用しても係合力が低下しないという利点がある。これらは係合部となる不織布と基盤となる不織布の二つ以上の繊維層を高圧水流で交絡させて一体化した面ファスナー雄材である。

【０００３】また基盤の繊維層を熱収縮させて、もう一方の係合部の繊維層に凹凸を形成させた嵩高性不織布がある。例えば、特開昭６０－１７１６４号公報には長繊維不織布と熱収縮性の大きな不織布を積層し、長繊維不織布の表面に畝を形成させた不織布が、また、特開昭６３－３０９６５７号公報には、感熱収縮性繊維と非収縮性繊維からなり、感熱収縮性繊維の収縮発現により非収縮性繊維に撓みが生じて不織布表面に多数の畝が形成された不織布が開示されている。

【０００４】また、別の例にも、このような不織布に形成された凸部を係合部として用いる面ファスナー雄材が、例えば特開平６－３３３５９号公報において提案されている。さらに特開平９－１５８０２２号公報において本出願人が開示した面ファスナー雄材は係合部の表面は長手方向に筋状の畝部が形成され、さらにこの畝部と直交する多数の凸部をもつもので、係合部がスパンボンド不織布、メルトブロー不織布のような長繊維不織布からなるものを記載している。

【０００５】

【発明が解決しようとする課題】これらの不織布はいずれも二つの繊維層をニードルパンチングや高圧柱状水流により筋状に交絡部分をつくり繊維層間を一体化させた後、一方の繊維層の熱収縮応力を利用してもう一方の繊維層を盛り上がらせるようにしたものである。従って凸部が形成されている部分は繊維層間の交絡の度合いが低く繊維の自由度が比較的高いから繊維層が非常に柔らかく、面ファスナー雄材の係合部と係合しやすいという利点があった。

【０００６】しかしながら係合部の不織布は構成繊維が相互に熱接着しているため、熱接着部分に雄材のフック部があたるとフック部の先端が不織布内に貫通できない部分がある。このため係合箇所が少なくなり、このような部分が多いと面ファスナー係合力が弱くなる欠点があ

った。しかも実際に面ファスナー雌材として例えば紙おむつ等に使用されるときは、その大きさは2×3ｃｍ程度であり、このような小さく切断して使う製品の全てを管理することは困難であり、このような係合力の弱い面ファスナー雌材を装着された製品は使用者に不便をかけていたのである。

【０００７】本発明は面ファスナー雌材に熱繊維不織布を使用し、従来のものより係合力の高い、しかも繰り返しの着脱によっても係合力の低下しない面ファスナー雌材を提供することを目的とする。

【０００８】

【課題を解決するための手段】本発明者等は第二繊維層の熱接着不織布を構成する繊維群のなかのある部分を破断した、特定の構造の不織布を使用することによりこの課題を解決した。

【０００９】すなわち本発明は、第一繊維層と第二繊維層とが繊維同士の交絡により一体化されてなる不織布において、第二繊維層は熱接着不織布であり該熱接着不織布を構成する繊維群のうちの少数部分が破断し、及び／又は繊維群の隣接する繊維間の接着部分のうちの少数部分が剥離している毛羽の多い不織布であり、第二繊維層を係合部として使用することを特徴とする面ファスナー雌材。

【００１０】上記面ファスナー雌材は、第二繊維層が短い畝状の多数の凹凸をもつものであることが好ましい。

【００１１】また上記面ファスナー雌材の別の態様は、第一繊維層と第二繊維層とが繊維同士の交絡により一体化されてなる不織布において、交絡部が筋状に存在し、かつ交絡部の間の部分の第二繊維層は盛り上がった連続する畝部を形成しているものである。

【００１２】さらに上記面ファスナー雌材の別の態様は、上記の盛り上がった連続する畝部に交絡部と直交する方向を長手とする短い畝状の多数の凹凸をもつものである。上記第二繊維層の熱接着不織布はスパンボンド不織布もしくはメルトブロー不織布であることが好ましい。

【００１３】上記短い畝状の多数の凹凸をもつ態様の本発明の面ファスナー雌材の第一繊維層は熱により収縮する性質を有する繊維層であり、第二繊維層は第一繊維層が収縮する温度より高い収縮開始温度をもつ繊維層からなる。

【００１４】上記本発明の面ファスナー雌材の各々の製造方法は、繊維の薄層ウェブである第一繊維層の少なくとも片面に、熱接着不織布であり該熱接着不織布を構成する繊維群のうちの少数部分が破断し、及び／又は繊維群の隣接する繊維間の接着部分のうちの少数部分が剥離している毛羽の多い不織布である第二繊維層を積層し、これに高圧柱状水流を噴射して、両繊維層を一体化させることを特徴とする面ファスナー雌材の製造方法。

【００１５】また別の態様では、熱により収縮する性質を有する第一繊維層の少なくとも片面に、第一繊維層が収縮する温度では実質的に収縮しない熱接着不織布である第二繊維層を積層し、これに高圧柱状水流を噴射して、両繊維層を一体化させた後、加熱処理を施すことにより、第一繊維層を収縮させ、第二繊維層に、短い畝状の多数の凸部を形成させることを特徴とする面ファスナー雌材の製造方法。

【００１６】さらに別の態様では、熱により収縮する性質を有する第一繊維層の少なくとも片面に、第一繊維層が収縮する温度では実質的に収縮しない熱接着不織布である第二繊維層を積層し、これに高圧柱状水流を筋状に噴射して、両繊維層を一体化させるとともに筋状の交絡部の間を盛り上がった連続する畝部とした後、加熱処理を施すことにより、第一繊維層を収縮させ、該畝部上に畝部と直交する方向を長手とする短い多数の凹凸を形成させることを特徴とする面ファスナー雌材の製造方法である。

【００１７】上記短い畝状の多数の凹凸をもつ態様の本発明の面ファスナー雌材の第一繊維層には、最大熱収縮率５０％以上である熱収縮繊維を３０重量％以上好ましくは４０重量％以上含む繊維層を使用すると都合がよい。

【００１８】上記本発明の面ファスナー雌材の第二繊維層の熱接着不織布は切断強力ＭＤ（長さ方向）０．５～３．０ｋｇ／５ｃｍ、ＣＤ（幅方向）０．２～０．８ｋｇ／５ｃｍ及び目付５～２０ｇ／m^2 の不織布を使用する事が好ましい。

【００１９】

【発明の実施の形態】本発明の面ファスナー雌材は二層の不織布からなり、その係合部となる第二繊維層が特定の構成をもった熱接着不織布である。

【００２０】本発明の第二繊維層に使用する熱接着不織布は、構成繊維中の熱接着繊維が熱溶融して周囲の繊維間を接着しているものであり、すべての構成繊維が接着部分をもつ不織布が好ましく、特にスパンボンド不織布、メルトブロー不織布は薄く低目付のものが得られやすいので好ましい。

【００２１】そして上記不織布は、構成繊維の繊維群のうちの少数部分が破断し、及び／又は繊維群の隣接する繊維間の接着部分のうちの少数部分が剥離しており毛羽の多い不織布を使用する。

【００２２】上記毛羽の多い不織布とは次ぎのようなものを言う。第二繊維層の面ファスナーの係合部面を表にして任意の箇所で二つ折りにし、折り目の稜線部分に２５．５ｍｍ四方の枠を持つ繊維拡大鏡を１０回当てて観察するとき稜線上２５．５ｍｍ巾の中に１本以上の繊維端が５回以上見つかるものをいう。　このような熱接着不織布は例えばスパンボンド不織布を幅方向にテンターで拡幅して、構成繊維の一部を破断し或いは接着部分を剥離させて得ることができる。

【００２３】このような構造の熱接着不織布は、特に切断強力と目付とが特定のものであることが好ましい。すなわち、切断強力MD（長さ方向）０．５～３．０ｋｇ／５ｃｍ、CD（幅方向）０．２～０．８ｋｇ／５ｃｍ、より好ましくはMD０．８～２．５ｋｇ／５ｃｍ、CD０．３～０．６ｋｇ／５ｃｍ、及び目付5～２０ｇ／m^2 より好ましくは8～１５ｇ／m^2 程度のものである。MDは不織布の長さ方向、CDは不織布の幅方向である。

【００２４】このような熱接着不織布を面ファスナー雌材の係合部に使うと表面の構成繊維は比較的自由に動き得る状態にあるので、雄材のフックに容易に係合でき、フック全体の係合本数が増加するから面ファスナーの剥離強力が向上する。

【００２５】このような熱接着不織布を構成する繊維は熱溶融性の繊維であればよいが例えば、アセテート等の半合成繊維、ナイロン6、ナイロン６６等のポリアミド系繊維、ポリエチレンテレフタレート、ポリブチレンテレフタレート等のポリエステル系繊維、ポリエチレン、ポリプロピレン等のポリオレフィン系繊維等から任意に一あるいは二以上選択して使用することができる。繊維形状等も特に限定されず、分割性複合繊維や異形断面を有する繊維等を任意に使用することができる。

【００２６】これらの繊維を短繊維状にして定法によりカードを通し、パラレルウェブやクロスウェブ等にしてこれを熱ロールをとおして不織布にしたものや、一度高圧水流処理を施して不織布化した後熱処理したものが使用できる。

【００２７】しかし第二繊維層は面ファスナー雌材の係合部となるものであるからなるべく軽量で均一な地合いをもつことが望ましく、スパンボンド不織布やメルトブロー不織布が良好に使用できる。なかでもポリエステル繊維のスパンボンド不織布は比較的融点がたかく、１～１０デニール程度の繊度のものがフックと係合しやすい。第一繊維層を熱収縮させて第二繊維層に凹凸を生じさせるときには特に好ましく使用できる。繊度は１～１０デニール程度のものがフックと係合しやすい。

【００２８】これら不織布をテンター等で幅方向に１０～５０％拡幅し、構成する繊維群のうちの少数部分を破断し、及び／又は繊維群の隣接する繊維間の接着部分のうちの少数部分を剥離し、繊維端を多数発生させ毛羽の多い不織布として使用する。拡幅処理にあたって全体が均一に拡幅され目付のムラがないように徐々に拡幅するのがよい。

【００２９】次ぎに第一繊維層につき説明する。第一繊維層は薄物の不織布である。その目付は５ｇ／m^2 以上好ましくは１０ｇ／m^2 以上である。あまり目付が軽いと均一な繊維層をつくることが難しいからである。その素材は熱収縮繊維層を要するとき以外は特に限定されない。通常のカードウェブから高圧水流処理あるいは熱接着処理による不織布を形成し得る短繊維やスパンボンド不織布、メルトブロー不織布になり得る素材であればよい。例えばレーヨン等の再生繊維、アセテート等の半合成繊維、ナイロン6、ナイロン６６等のポリアミド系繊維、ポリエチレンテレフタレート、ポリブチレンテレフタレート等のポリエステル系繊維、ポリエチレン、ポリプロピレン等のポリオレフィン系繊維等から任意に一あるいは二以上選択して使用することができる。繊維形状等も特に限定されず、分割性複合繊維や異形断面を有する繊維等を任意に使用することができる。

【００３０】特に第一繊維層を熱収縮させ、第二繊維層に凹凸を形成させるときは熱収縮性繊維あるいは潜在捲縮性繊維を３０重量％以上含まれていることが必要である。３０重量％未満では熱収縮が不十分になるからである。好ましくは４０重量％以上である。第一繊維層を構成する繊維の好ましい例として、熱によって収縮する熱収縮性繊維を挙げることができる。本発明では、最大熱収縮率が少なくとも５０％以上である熱収縮性繊維を使用することが好ましい。ここで最大熱収縮率とは、加熱された繊維が繊維の形状を保ったままで示す熱収縮率のうちで最大のものをいう。最大熱収縮率が５０％未満では、第一繊維層の熱収縮が不十分で第二繊維層に形成される凸部の数が少なくなり、嵩高性に乏しいものとなる。

【００３１】なかでもエチレン－プロピレンランダムコポリマーからなる繊維は融解ピーク温度（Ｔｍ）が１３０～１４５℃の範囲にあるエチレン－プロピレンランダムコポリマーを７０重量％以上含むオレフィン系ポリマーからなる繊維を選ぶと最大熱収縮率が少なくとも５０％であり、この繊維を繊維層に３０重量％以上混合すると十分な収縮が得られる。ここで融解ピーク温度（Ｔｍ）とは、示差走査熱量計（ＤＳＣ）によりポリマーノ融解熱測定を行ったときにＤＳＣ曲線が最高値を示すときの温度をいう。Ｔｍが１３０℃未満であるとポリマーがゴム的弾性を示すようになり、繊維のカード通過性が悪くなる。逆に１４５℃を超えると、繊維の熱収縮性が通常のポリプロピレン程度となってしまうために好ましくない。

【００３２】また熱により捲縮を発現する潜在捲縮性繊維を使用するときは加熱により２５．５ｍｍあたり２５個以上の立体捲縮を発現するような繊維を使用することが好ましい。２５個未満では、繊維層全体を十分に収縮させることができないからであり、より好ましくは３０～６０個である。かかる潜在捲縮性繊維を用いた場合、収縮した後の第一繊維層は良好な伸縮性を有するものとなるため、最終的に得られる面ファスナー雄材の不織布には伸縮性が付与されることとなる。この場合熱収縮性繊維あるいは潜在捲縮性繊維は、第一繊維層中に３０重量％以上含まれていることが望ましい。３０重量％未満では、第一繊維層の収縮が不十分となるからである。こ

れらの繊維が３０重量%以上含まれていれば、第一繊維層にその他の繊維を混合することができる。混合する繊維は特に限定されず、レーヨン等の再生繊維、アセテート等の半合成繊維、ナイロン６、ナイロン６６等のポリアミド系繊維、ポリエチレンテレフタレート、ポリブチレンテレフタレート等のポリエステル系繊維、ポリエチレン、ポリプロピレン等のポリオレフィン系繊維等から任意に一あるいは二以上選択して使用することができる。特に、前述のエチレン－プロピレンランダムコポリマーからなる繊維のように疎水性の繊維をを使用する場合には、親水性繊維であるレーヨン繊維と混合して第一繊維層を構成すると、高圧水流の衝撃による繊維の「飛び散り」が抑制され、高圧水流による繊維同士の交絡が強固なものとなるので好ましい。勿論、第一繊維層は熱収縮性繊維あるいは潜在捲縮性繊維のみから構成されていてもよい。

【００３３】第一繊維層を熱収縮させる場合、第一繊維層の態様は、ステープル繊維からなるパラレルウェブ、クロスウェブ、セミランダムウェブ、ランダムウェブなど何れであっても良いが、繊維層の熱収縮の方向を一方向に集中させるほうが、第二繊維層に凸部が均一に形成される。従って、第一繊維層はパラレルウェブであることが望ましい。また、後述するように、本発明においては、第一繊維層と第二繊維層の交絡処理は部分的に施されるため、交絡部以外の部分においては、第一繊維層中の繊維同士を予め交絡あるいは接合させておく必要がある。そのため、第一繊維層には予め高圧水流等による交絡処理を施し、これを不織布の状態としてから、後述する繊維層間の交絡処理を施すことが望ましい。

【００３４】第一繊維層の目付は５ｇ／ｍ^2 以上であることが望ましい。５ｇ／ｍ^2 未満では均一な繊維層を作成することが難しいからである。より好ましくは１０～４０ｇ／ｍ^2 である。第一繊維層と第二繊維層は、繊維同士の交絡により一体化される。交絡は高圧柱状水流により繊維層の全面にわたる方法、あるいは交絡部を筋状に作る方法があるが、全面に交絡部を作ると第二繊維層の係合部に寄与する繊維がすくなくなるので交絡部を筋状に作ることが好ましい。

【００３５】すなわち交絡部は、図５、図６のように、交絡部（１）がストライプ状に形成され、それ以外の部分では第一繊維層（２）と第二繊維層（３）の間が実質的に交絡していない状態であり、第二繊維層は畝部（４）形成する。

【００３６】かかる筋状の交絡部を形成させる方法としては、第一繊維層と第二繊維層とからなる積層体に、孔径０．０５～０．５ｍｍのオリフィスが巾方向に一定の間隔をおいて穿設されたノズルから高圧水流を噴射する方法が挙げられる。この方法によれば、水流が被処理物に衝突する部分はごく一部に限られるので、それだけ繊維の「飛び散り」を抑制することができ、両繊維層を均一な状態で一体化させることができる。ここでオリフィスの間隔は、そのまま交絡部の間隔となる。但し、この間隔は、後の第一繊維層の熱収縮により狭くなることに留意する必要がある。本発明においては、オリフィスの間隔、即ち交絡部の間隔は０．５～１５ｍｍであることが望ましい。交絡部を筋状にするときはオリフィス間隔２ｍｍ未満では実質的に不織布全面に水流を噴射したのと変わらず、繊維の「飛び散り」が無視できなくなる。また、１５ｍｍを超えると、一定面積中に占める交絡部の割合が小さくなりすぎ、両繊維層間の一体化が不十分となるため好ましくない。より好ましくは３～１０ｍｍである。

【００３７】また、この方法により高圧水流処理を施す場合、交絡部の占める面積が小さいため、被処理物全面に水流を噴射する場合よりも水圧をやや高めに設定して交絡を強固にするとよい。具体的には、６０ｋｇ／ｃｍ^2 以上であることが好ましい。より好ましくは８０～１８０ｋｇ／ｃｍ^2 である。

【００３８】第一繊維層が熱収縮する場合は、この一体化された積層不織布に加熱処理を施して、第一繊維層を収縮させ、交絡部以外の部分の第二繊維層に凹凸を形成させる。このとき加熱処理時に不織布の長さ方向にオーバーフィードさせ、図７、図８に示すように畝部（４）と直交する方向を長手とする凸部（５）を多数形成する。　上記の場合、第一繊維層の縦方向の収縮率は、１０～８０%であることがことが望ましい。１０%未満では、畝の形成が不十分で不織布に十分な嵩高性を付与することができず、また面ファスナー雄材として用いた場合には、凸部の数が少ないために係合力が不十分となる。収縮率が大きくなるほど、形成される畝の数は多くなるが、８０%以上収縮させると繊維密度が高くなって触感が硬くなり、またこれを面ファスナー雄材として用いても係合力は変わらず、むしろ厚みが増し、柔軟性が悪くなるので好ましくない。

【００３９】また、第一繊維層の横方向の収縮率は２～６０%程度であることが望ましい。あまり横方向の収縮率が大きくなると、交絡部の間において、上述したような細かな畝状の凸部が形成されにくくなるからである。

【００４０】縦方向の収縮率を大きくし、横方向の収縮率を押さえるためには、第一繊維層として、構成繊維の大部分が縦方向に配列したパラレルウェブからなる不織布を使用するとよい。

【００４１】加熱処理は、第一繊維層中の熱収縮性繊維あるいは潜在捲縮性繊維が、熱収縮あるいは捲縮する温度で行う。具体的には、例えば熱風貫通型乾燥機により行うことができる。この場合、熱収縮率は温度および滞留時間によって決定される。例えば、熱収縮性繊維として前述したエチレン－プロピレンランダムコポリマーからなる繊維を用いる場合には、加熱温度（T℃）を１００＜T＜Tm＋３０の範囲内とし、この温度で１０秒～

1分間加熱処理を施せばよい。加熱温度が100℃未満では熱収縮が不十分であり、Tm＋30℃を超えると繊維が完全に溶融し収縮応力が著しく低下するため好ましくない。

【0042】このようにして得られる本発明の不織布は、交絡部が筋状に存在し、交絡部の間において不織布の横方向を長手とする畝状の凸部が多数形成されたものである。そして、畝状の凸部においては繊維の自由度が比較的高いから、不織布全体は非常に柔らかく、また、面ファスナー雄材の係合部と非常に係合しやすいという利点を有するものである。また、交絡部の占める割合が少ないため、低目付であっても均一で、優れた外観を呈する不織布を得ることができる。

【0043】

【実施例】以下、本発明の内容を実施例を挙げて具体的に説明する。なお、得られた面ファスナー性能（毛羽の多さ、剥離強力）は、次のような方法で測定した。

【0044】毛羽の多さ

図9に示すように第二繊維層の面ファスナー雄材の係合部面を表にして任意の箇所で二つ折りにし、折り目の稜線部分（6）に25．5mm四方の枠を持つ繊維拡大鏡（8）を10回当てて観察するとき図10に示すように折り目の稜線部分（6）上25．5mm巾の中に1本以上の繊維端（7）が見つかる回数。本発明の面ファスナー雄材は5回以上観察できるものをいう。

【0045】剥離強力

高さ約0．5mmのキノコ型フック部が1cm² あたり約200本設けられた幅3cm長さ8cmの面ファスナー雄材を本発明の面ファスナー雌材上におき重さ1kgのローラーで1往復して接着した。次いで係合した一方の端部4cm（雄材と雌材の合計8cm）を剥がして、角度180度の方向に上と下に分け、オリエンテック（株）製テンシロンを用いて、速度30cm／分で約3cm剥離した。そしてグラフから極大点6点、極小点6点を読み取り、その平均値を剥離強力（gf／3cm）とした。

【0046】［実施例］以下のように第一繊維層、第二繊維層を準備した。

第一繊維層

ポリエチレン（鞘）ポリプロピレン（芯）の複合繊維（2デニール、51mm）50%と融解ピーク温度（Tm）136℃のエチレン－プロピレンランダムコポリマ*

*一繊維（2デニール、51mm）50%を混合し20g／m² のウェブを作成した。次いでこのウェブに水圧50kg／cm² の高圧柱状水流を噴射し、繊維同士を交絡させて不織布にしこれを第一繊維層とした。

第二繊維層

ポリプロピレンスパンボンド不織布PPSB（旭化成株式会社製）15g／m² をテンターで横方向に拡幅しイ、ロ、ハ3種類の目付の不織布とした。各々の目付（g／m² ）及び強力（kg／5cm）は次ぎのとおりであった。

	目付	強力 MD	CD
初期	15．0	2．7	0．6
イ	13．3	2．5	0．5
ロ	12．0	1．8	0．4
ハ	10．7	0．9	0．3

【0047】第一繊維層と第二繊維層の一体化

上記二つの繊維層を重ね合わせ第二繊維層の側から水圧60kg／cm² の高圧柱状流を各々次ぎのように噴射して面ファスナー雄材を作成した。た。

A　不織布の移動速度8m／分で全面に噴射（図1の斜視図及び図2の断面図に示す面ファスナー雄材）。

B　不織布の移動速度4m／分で5mmピッチで線状に噴射（図5の斜視図及び図6の断面図に示す面ファスナー雄材）。

【0048】熱収縮処理

上記A、Bの方法で作成した面ファスナー雄材を135℃、コンベアの移動速度8．6m／分、約2倍のオーバーフィードで熱風処理し、エチレン－プロピレンランダムコポリマー繊維を収縮させることにより第一繊維層を面収縮させ、第二繊維層に小さい畝状の凸部を多数形成した。図3の斜視図及び図4の断面図に示すように上記Aによる面ファスナー雄材を熱処理したものは長辺が幅方向の小さい畝部を全面に多数形成した。図7の斜視図及び図8の断面図に示すように上記Bによる面ファスナー雄材を熱処理したものは長辺が幅方向の小さい凸部を畝部の表面に多数形成した。

【0049】面ファスナー雄材の性能

スパンボンド不織布を拡幅せずその初期のまま第二繊維層に使ったものを比較例、拡幅して第二繊維層に使ったものを本発明の実施例として性能を比較した。

第二繊維層	一体化の方法	熱収縮処理	毛羽発見回数	剥離強力
初期	A	なし	0	30
初期	A	あり	0	33
初期	B	なし	1	75
初期	B	あり	1	71
イ	A	なし	8	105
イ	A	あり	8	110
イ	B	なし	8	117

１１				１２
イ	B	あり	８	１２４
ロ	A	なし	９	１３３
ロ	A	あり	１０	１４４
ロ	B	なし	１０	１４０
ロ	B	あり	１０	１３６
ハ	A	なし	１０	１６６
ハ	A	あり	１０	１７０
ハ	B	なし	１０	２３０
ハ	B	あり	１０	２２７

【００５０】

【発明の効果】上記のとおりスパンボンド不織布を拡幅して第二繊維層とし、係合部に使った本発明の面ファスナー雌材はいずれも１００以上の高い係合力を示した。これに対しスパンボンド不織布をそのまま係合部にした比較例の面ファスナー雌材は約３５％程度の係合力が低い結果であった。この面ファスナー雌材は、紙おむつ等のディスポーザブル商品に特に好ましく使用される。

【図面の簡単な説明】

【図１】第一繊維層と第二繊維層の全面が高圧柱状水流により一体化された状態を示す斜視図である。

【図２】第一繊維層と第二繊維層の全面が高圧柱状水流により一体化された状態を示す断面図である。

【図３】第一繊維層と第二繊維層の全面が高圧柱状水流により一体化され畝状の凸部を形成した状態を示す斜視図である。

【図４】第一繊維層と第二繊維層の全面が高圧柱状水流により一体化され畝状の凸部を形成した状態を示す断面図である。

【図５】第一繊維層と第二繊維層が高圧柱状水流により筋状に一体化された状態を示す斜視図である。

＊【図６】第一繊維層と第二繊維層が高圧柱状水流により筋状に一体化された状態を示す断面図である。

【図７】第一繊維層と第二繊維層が高圧柱状水流により筋状に一体化され畝状の凸部を形成した状態を示す斜視図である。

【図８】第一繊維層と第二繊維層が高圧柱状水流により筋状に一体化され畝状の凸部を形成した状態を示す断面図である。

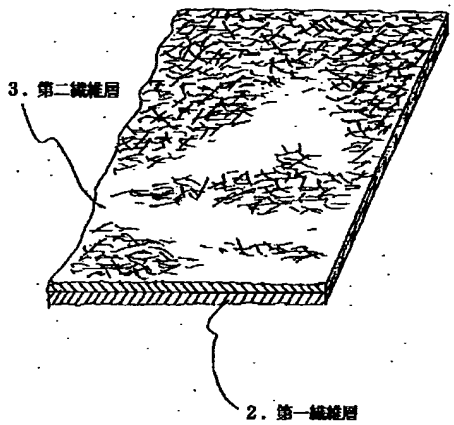
【図９】毛羽の状態を測定する方法を示す斜視図である。

【図１０】毛羽の状態を拡大繊維鏡で測定した一例である。

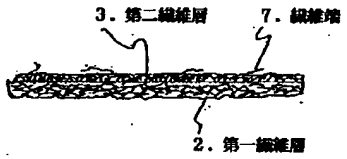
【符号の説明】

１　交絡部
２　第一繊維層
３　第二繊維層
４　畝部
５　凸部
６　折り目の稜線部分
７　繊維端
８　繊維拡大鏡

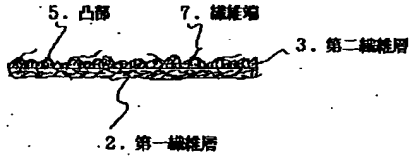
【図１】



【図２】



【図４】



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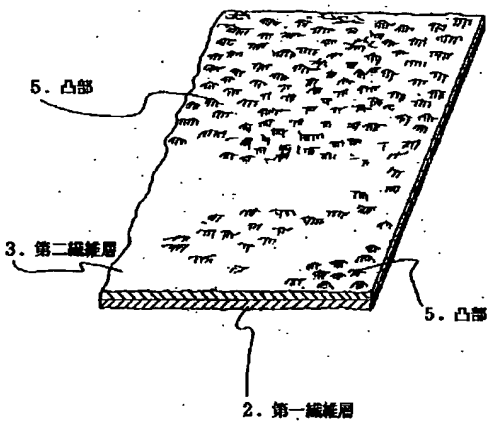

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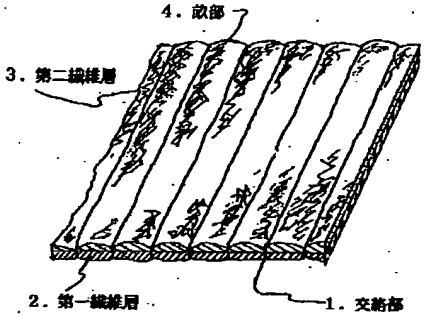

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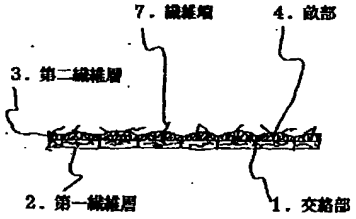

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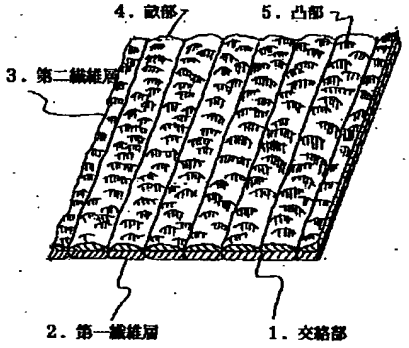

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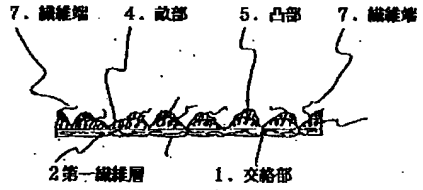

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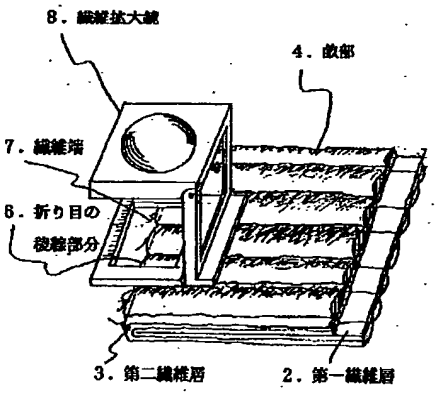

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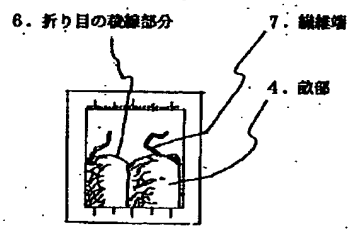

PATENT ABSTRACTS OF JAPAN

(11)Publication number : **11-061624**
(43)Date of publication of application : **05.03.1999**

(51)Int.CI. **D04H 11/08**
A44B 18/00
D04H 3/10

(21)Application number : **09-227284**
(22)Date of filing : **07.08.1997**

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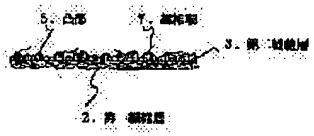
(54) HOOK-AND-LOOP FASTENER FEMALE MATERIAL EXCELLENT IN PEELING STRENGTH AND ITS PRODUCTION

(57)Abstract:
PROBLEM TO BE SOLVED: To obtain a hook-and-loop fastener female material free from the deterioration of an engaging force, even when repeatedly used for the engagement and disengagement with a male material, improved in operability and suitable for disposable commodities and the like by integrally laminating the specific second fiber layer to the surface of the first fiber layer comprising a thin fiber web.
SOLUTION: This hook-and-loop fastener female material is obtained by laminating the second fiber layer 3 to at least one surface of the first fiber layer 2 comprising a thin fiber web and subsequently jetting a high pressure columnar water flow to the laminate to integrate both the fiber layers. The second fiber layer 3 comprises a highly fuzzy, thermally fused non-woven fabric wherein small portions of a fiber group constituting the thermally fused non-woven fabric are broken and/or small portions of the fused portions between the adjacent fibers of the fiber group are peeled. Both the fiber layers 2, 3 are preferably integrated and subsequently thermally treated to shrink the first fiber layer 2, thus forming many short row-like projections 5 in the second fiber layer 3. A fiber layer containing thermally shrinkable fibers having the maximum thermal shrinkage degree of ≥50% in an amount of ≥30 wt.% is preferably used for the first fiber layer 2.



LEGAL STATUS
[Date of request for examination]
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
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[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

CLAIMS

[Claim(s)]

[Claim 1] In the nonwoven fabric with which the confounding of fiber comes to unify the first fiber layer and the second fiber layer The amount of fraction of the fiber groups which are heat adhesion nonwoven fabrics and constitute this heat adhesion nonwoven fabric fractures the second fiber layer. And/or, field fastener female material which is a nonwoven fabric with many fluffs in which the amount of fraction of the inside for jointing between the fiber which a fiber group adjoins has exfoliated, and is characterized by using the second fiber layer as the engagement section.

[Claim 2] the ridge where the second fiber layer is short -- field fastener female material with much irregularity of a ** according to claim 1

[Claim 3] the continuous ridge where the confounding section existed in the shape of a line, and the second fiber layer of portions other than the confounding section rose in the nonwoven fabric with which the confounding of fiber comes to unify the first fiber layer and the second fiber layer -- the field fastener female material according to claim 1 which forms the section

[Claim 4] the short ridge which makes straight side the direction which intersects perpendicularly with this **** on continuous **** which rose -- field fastener female material with much irregularity of a ** according to claim 3

[Claim 5] the claims 1-4 whose heat adhesion nonwoven fabrics of the second fiber layer are a span bond nonwoven fabric or a melt blow nonwoven fabric -- field fastener female material given in either

[Claim 6] It is the field fastener female material according to claim 2 or 4 which is a fiber layer with contraction start temperature with the second fiber layer the first fiber layer is a fiber layer which has the property contracted with heat, and higher than the temperature which the first fiber layer contracts.

[Claim 7] The amount of fraction of the fiber groups which are heat adhesion nonwoven fabrics and constitute this heat adhesion nonwoven fabric at least on one side of the first fiber layer which is the thin layer web of fiber fractures. And/or, the manufacture method of the field fastener female material which carries out the laminating of the second fiber layer which is a nonwoven fabric with many fluffs in which the amount of fraction of the inside for jointing between the fiber which a fiber group adjoins has exfoliated, and is characterized by injecting a high-pressure pillar-shaped stream to this, and making both the fiber layer unify.

[Claim 8] Carry out the laminating of the second fiber layer which is the heat adhesion nonwoven fabric which is not substantially contracted at the temperature which the first fiber layer contracts to at least one side of the first fiber layer which has the property contracted with heat, and a high-pressure pillar-shaped stream is injected to this. after making both the fiber layer unify, the first fiber layer is contracted by giving heat-treatment -- making -- a ridge short in the second fiber layer -- the manufacture method of the field fastener female material characterized by making much heights of a ** form

[Claim 9] Carry out the laminating of the second fiber layer which is the heat adhesion nonwoven fabric which is not substantially contracted at the temperature which the first fiber layer contracts to at least one side of the first fiber layer which has the property contracted with heat, and a high-pressure pillar-shaped stream is injected in the shape of a line to this. the continuous ridge which rose between the line-like confounding sections while making both the fiber layer unify -- after considering as the section, the first fiber layer is contracted by giving heat-treatment -- making -- this **** top -- a ridge -- the manufacture method of the field fastener female material characterized by making the irregularity of short a large number which make straight side the direction which intersects perpendicularly with the section form

[Claim 10] The first fiber layer is the manufacture method of the field fastener female material according to claim 8 or 9 which uses the fiber layer which contains the thermal-contraction fiber which is 50% or more of rates of the maximum thermal contraction 30% of the weight or more.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the field fastener female material which was excellent in the ablation strong force with male material in use, and its manufacture method.
[0002]
[Description of the Prior Art] The field fastener female material which made the engagement section a heat adhesion nonwoven fabric like a span bond nonwoven fabric or a melt blow nonwoven fabric, and united this with other nonwoven fabrics from before is known. A heat adhesion nonwoven fabric has the advantage that the engagement force does not decline even if it uses it as a field fastener by which repeat attachment and detachment are carried out, since each fiber has pasted up mutually. These are the field fastener female material which was made to carry out the confounding of the two or more fiber layers of the nonwoven fabric used as the nonwoven fabric used as the engagement section, and a base with a high-pressure stream, and was unified.
[0003] Moreover, the thermal contraction of the fiber layer of a base is carried out, and there is a loft nonwoven fabric which made irregularity form in the fiber layer of another engagement section. For example, the laminating of a continuous-glass-fiber nonwoven fabric and the big nonwoven fabric of thermal-contraction nature is carried out to JP,60-17164,A, the nonwoven fabric which made the ridge form in the front face of a continuous-glass-fiber nonwoven fabric becomes JP,63-309657,A from sensible-heat shrinkage-characteristics fiber and non-shrinkage-characteristics fiber again, and the nonwoven fabric by which bending arose for non-shrinkage-characteristics fiber by the contraction manifestation of sensible-heat shrinkage-characteristics fiber, and many ridges were formed in the nonwoven face side is indicated.
[0004] Moreover, the field fastener female material using the heights formed in such a nonwoven fabric as the engagement section is proposed by another example in JP,6-33359,A. the field fastener female material which these people furthermore indicated in JP,9-158022,A -- the front face of the engagement section -- a longitudinal direction -- a line-like ridge -- the section forms -- having -- further -- this ridge -- it has the heights of a large number which intersect perpendicularly with the section, and the engagement section has indicated what consists of a continuous-glass-fiber nonwoven fabric like a span bond nonwoven fabric and a melt blow nonwoven fabric
[0005]
[Problem(s) to be Solved by the Invention] After each of these nonwoven fabrics builds a confounding portion for two fiber layers in the shape of a line by needle punching or the high-pressure pillar-shaped stream and makes between fiber layers unify, it is made to rise another fiber layer using the thermal-contraction stress of one fiber layer. Therefore, the portion in which heights are formed had the advantage of a fiber layer being very soft since the degree of the confounding between fiber layers is low and the flexibility of fiber is comparatively high, and being easy to engage with the engagement section of field fastener male material.
[0006] However, since composition fiber is carrying out heat adhesion mutually, the nonwoven fabric of the engagement section has the portion which the nose of cam of the hook section cannot penetrate in a nonwoven fabric, when the hook section of male material hits a part for heat jointing. For this reason, the engagement part decreased, and when there were many such portions, there was a fault to which the field fastener engagement force becomes weak. And when actually being used for a disposable diaper etc. as field fastener female material, the size is about 2x3cm, it is difficult to manage such all products used cutting small, and the product equipped with the weak field fastener female material of such engagement force had applied inconvenience to the user.
[0007] this invention uses a heat fiber nonwoven fabric for field fastener female material, and it aims at offering the field fastener female material with the engagement force higher than the conventional thing to which the engagement force moreover does not fall by attachment and detachment of a repeat, either.
[0008]
[Means for Solving the Problem] this invention person etc. solved this technical problem by using the nonwoven fabric of the specific structure which fractured a certain portion in the fiber group which constitutes the heat adhesion nonwoven fabric of the second fiber layer.
[0009] Namely, this invention is set to the nonwoven fabric with which the confounding of fiber comes to unite the first fiber layer and the second fiber layer. The amount of fraction of the fiber groups which are heat adhesion nonwoven fabrics and constitute this heat adhesion nonwoven fabric fractures the second fiber layer. And/or, field fastener female material which is a nonwoven fabric with many fluffs in which the amount of fraction of the inside for jointing between the fiber which a fiber group adjoins has exfoliated, and is characterized by using the second fiber layer as the engagement section.

[0010] the ridge where the above-mentioned field fastener female material has the short second fiber layer -- it is desirable that it is a thing with much irregularity of a **
[0011] moreover, the continuous ridge where, as for another mode of the above-mentioned field fastener female material, the confounding section existed in the shape of a line in the nonwoven fabric with which the confounding of fiber comes to unify the first fiber layer and the second fiber layer, and the second fiber layer of the portion between the confounding sections rose -- the section is formed
[0012] the continuous ridge where, as for mode with the still more nearly another above-mentioned field fastener female material, the above rose -- the short ridge which makes straight side the direction which intersects perpendicularly with the confounding section at the section -- it has much irregularity of a ** As for the heat adhesion nonwoven fabric of the above-mentioned second fiber layer, it is desirable that they are a span bond nonwoven fabric or a melt blow nonwoven fabric.
[0013] the above -- a short ridge -- the first fiber layer of the field fastener female material of this invention with much irregularity of a ** of a mode is a fiber layer which has the property contracted with heat, and the second fiber layer consists of a fiber layer with contraction start temperature higher than the temperature which the first fiber layer contracts
[0014] Each manufacture method of the field fastener female material of the above-mentioned this invention The amount of fraction of the fiber groups which are heat adhesion nonwoven fabrics and constitute this heat adhesion nonwoven fabric at least on one side of the first fiber layer which is the thin layer web of fiber fractures. And/or, the manufacture method of the field fastener female material which carries out the laminating of the second fiber layer which is a nonwoven fabric with many fluffs in which the amount of fraction of the inside for jointing between the fiber which a fiber group adjoins has exfoliated, and is characterized by injecting a high-pressure pillar-shaped stream to this, and making both the fiber layer unify.
[0015] Moreover, carry out the laminating of the second fiber layer which is the heat adhesion nonwoven fabric which is not substantially contracted at the temperature which the first fiber layer contracts to at least one side of the first fiber layer which has the property contracted with heat in another mode, and a high-pressure pillar-shaped stream is injected to this. after making both the fiber layer unify, the first fiber layer is contracted by giving heat-treatment -- making -- a ridge short in the second fiber layer -- the manufacture method of the field fastener female material characterized by making much heights of a ** form
[0016] Carry out the laminating of the second fiber layer which is the heat adhesion nonwoven fabric which is not substantially contracted at the temperature which the first fiber layer contracts to at least one side of the first fiber layer which has the property contracted with heat in still more nearly another mode, and a high-pressure pillar-shaped stream is injected in the shape of a line to this. the continuous ridge which rose between the line-like confounding sections while making both the fiber layer unify -- by giving heat-treatment, after considering as the section the first fiber layer is contracted -- making -- this **** top -- a ridge -- it is the manufacture method of the field fastener female material characterized by making the irregularity of short a large number which make straight side the direction which intersects perpendicularly with the section form
[0017] the above -- a short ridge -- when the fiber layer which contains preferably the thermal-contraction fiber which is 50% or more of rates of the maximum thermal contraction 40% of the weight or more 30% of the weight or more is used for the first fiber layer of the field fastener female material of this invention with much irregularity of a ** of a mode, it is convenient for it
[0018] The heat adhesion nonwoven fabric of the second fiber layer of the field fastener female material of the above-mentioned this invention is 0.5-3.0kg (the length direction) of cutting powerful MD, 5cm, 0.2-0.8kg (cross direction) of CDs, 5cm and eyes 5 - 20 g/m2. It is desirable to use a nonwoven fabric.
[0019]
[Embodiments of the Invention] The field fastener female material of this invention is the heat adhesion nonwoven fabric in which the second fiber layer which consists of a nonwoven fabric of a bilayer and serves as the engagement section had specific composition.
[0020] The heat adhesion nonwoven fabric used for the second fiber layer of this invention has the desirable nonwoven fabric in which the heat adhesion fiber in composition fiber carries out a thermofusion, between surrounding fiber is pasted up, and all composition fiber has a part for jointing, and since the thin thing of low eyes is easy to be obtained, especially its span bond nonwoven fabric and melt blow nonwoven fabric are desirable.
[0021] And the amount of fraction of the inside for jointing between the fiber which the amount of fraction of the fiber groups of composition fiber fractures, and/or a fiber group adjoins has exfoliated, and a nonwoven fabric with many fluffs is used for the above-mentioned nonwoven fabric.
[0022] The nonwoven fabric with many above-mentioned fluffs means a thing like the next. The engagement aspect of the field fastener of the second fiber layer is made into a table, and it is made double fold in arbitrary parts, and when applying the fiber magnifying glass which has the frame of 25.5mm around in the ridgeline portion of a fold 10 times and observing it, one or more fiber edges say that which is found 5 times or more into ridgeline top 25.5mm width. Such a heat adhesion nonwoven fabric widens for example, a span bond nonwoven fabric by the tenter crosswise, and fractures a part of composition fiber, or makes the amount of jointing exfoliate, and can be obtained.
[0023] such a heat adhesion nonwoven fabric of structure -- especially -- cutting -- it is desirable that eyes are it specific things that it is powerful namely, 0.5-3.0kg (the length direction) of cutting powerful MD, 5cm, and 0.2-0.8kg (cross direction) of CDs, and 5cm -- more -- desirable -- 0.8-2.5kg of MD, 5cm, 0.3-0.6kg of CDs, 5cm, and eyes 5 - 20 g/m2 desirable -- 8 - 15 g/m2 It is the thing of a grade. MD is the length direction of a nonwoven fabric and CD is the cross direction of a nonwoven fabric.
[0024] Since surface composition fiber is in the state where it can move comparatively freely when such a heat adhesion nonwoven fabric is used for the engagement section of field fastener female material, it can engage with the hook of male material easily and the engagement number of the whole hook increases, the exfoliation strong force of a field fastener improves.

[0025] although the fiber which constitutes such a heat adhesion nonwoven fabric should just be fiber of thermofusion nature -- for example, the arbitration from polyolefin fibers, such as polyester fibers, such as polyamide fibers, such as semi-synthetic fibers, such as acetate, nylon 6, and Nylon 66, a polyethylene terephthalate, and a polybutylene terephthalate, polyethylene, and polypropylene, etc. -- 1 -- or it can be used, choosing two or more Especially a fiber configuration etc. is not limited but the fiber which has a division nature bicomponent fiber and a variant cross section can be used arbitrarily.
[0026] these fiber -- the shape of a staple fiber -- carrying out -- a law -- what used the card as through, a parallel web, a cross web, etc. by the method, and made this the nonwoven fabric through the hot calender roll, and the thing which performed and nonwoven-fabric-ized high-pressure stream processing at once and which carried out the postheat treatment can be used
[0027] It is made to spread, since the second fiber layer serves as the engagement section of field fastener female material, it is desirable to have conditions as lightweight as possible and uniform, and a span bond nonwoven fabric and a melt blow nonwoven fabric can use it good. As for the span bond nonwoven fabric of a polyester fiber, the thing of the melting points, or ** and the fineness of about 1-10 deniers tends [comparatively] to engage with a hook especially. When carrying out the thermal contraction of the first fiber layer and making the second fiber layer produce irregularity, it can be used especially preferably. As for fineness, an about 1-10-denier thing tends to engage with a hook.
[0028] These nonwoven fabrics are widened crosswise 10 to 50% by the tenter etc., and a part for the fraction of the inside for jointing between the fiber which a part for the fraction of the fiber groups to constitute is fractured, and/or a fiber group adjoins is exfoliated, many fiber edges are generated, and it is used as a nonwoven fabric with many fluffs. It is good to widen gradually so that the whole may be uniformly widened in extension processing and there may be no nonuniformity of eyes.
[0029] It explains per first fiber layer below. The first fiber layer is the nonwoven fabric of a split. The eyes are 5 g/m2. It is 10 g/m2 preferably above. It is above. It is because it is difficult to build a uniform fiber layer when eyes are not much light. The material is not limited except when [especially] requiring a thermal-contraction fiber layer. What is necessary is just the material which may become the staple fiber which can form the nonwoven fabric by high-pressure stream processing or heat adhesion processing from the usual card web, a span bond nonwoven fabric, and a melt blow nonwoven fabric. for example, the arbitration from polyolefin fibers, such as polyester fibers, such as polyamide fibers, such as semi-synthetic fibers, such as regenerated fibers, such as rayon, and acetate, nylon 6, and Nylon 66, a polyethylene terephthalate, and a polybutylene terephthalate, polyethylene, and polypropylene, etc. -- 1 -- or it can be used, choosing two or more Especially a fiber configuration etc. is not limited but the fiber which has a division nature bicomponent fiber and a variant cross section can be used arbitrarily.
[0030] Especially when carrying out the thermal contraction of the first fiber layer and making irregularity form in the second fiber layer, it is required to include thermal-contraction nature fiber or potential crimp nature fiber 30% of the weight or more. It is because a thermal contraction becomes inadequate at less than 30 % of the weight. It is 40 % of the weight or more preferably. As a desirable example of the fiber which constitutes the first fiber layer, the thermal-contraction nature fiber contracted with heat can be mentioned. It is desirable to use the thermal-contraction nature fiber whose rate of the maximum thermal contraction is at least 50% or more in this invention. The rate of the maximum thermal contraction means the greatest thing in the rate of a thermal contraction shown while the heated fiber had maintained the configuration of fiber here. Less than 50% of the thermal contraction of the first fiber layer is [the rate of the maximum thermal contraction] insufficient, and the number of the heights formed in the second fiber layer decreases, and it will become scarce at a loft.
[0031] When the fiber which consists of an ethylene-propylene random copolymer especially chooses the fiber which dissolution peak temperature (Tm) becomes from the olefin system polymer which contains the ethylene-propylene random copolymer in the range which is 130-145 degrees C 70% of the weight or more, the rate of the maximum thermal contraction is at least 50%, and sufficient contraction will be obtained if this fiber is mixed 30% of the weight or more in a fiber layer. Dissolution peak temperature (Tm) means temperature in case a DSC curve shows the highest value here, when a differential scanning calorimeter (DSC) performs the poly MANO heat-of-fusion measurement. Polymer comes to show rubber-elasticity that Tm is less than 130 degrees C, and the card permeability of fiber becomes bad. Conversely, if it exceeds 145 degrees C, since the thermal-contraction nature of fiber becomes the usual polypropylene grade, it is not desirable.
[0032] Moreover, when using the potential crimp nature fiber which discovers a crimp with heat, it is desirable to use fiber which discovers 25 or more solid crimps per 25.5mm by heating. In less than 25 pieces, it is because the whole fiber layer cannot fully be shrunk, and they are 30-60 pieces more preferably. Since the first fiber layer after contracting becomes what has good elasticity when this potential crimp nature fiber is used, elasticity will be given to the nonwoven fabric of the field fastener female material finally obtained. In this case, as for thermal-contraction nature fiber or potential crimp nature fiber, it is desirable to be contained 30% of the weight or more in the first fiber layer. At less than 30 % of the weight, it is because contracting [of the first fiber layer] becomes inadequate. If these fiber is contained 30% of the weight or more, other fiber is mixable in the first fiber layer. especially the fiber to mix is limited -- not having -- the arbitration from polyolefin fibers, such as polyester fibers, such as polyamide fibers, such as semi-synthetic fibers, such as regenerated fibers, such as rayon, and acetate, nylon 6, and Nylon 66, a polyethylene terephthalate, and a polybutylene terephthalate, polyethylene, and polypropylene, etc. -- 1 -- or it can be used, choosing two or more If it mixes with the rayon fiber which is hydrophilic fiber and constitutes the first fiber layer, in using hydrophobic ****** like the fiber which consists of the above-mentioned ethylene-propylene random copolymer especially, since "spilling" of the fiber by the shock of a high-pressure stream will be suppressed and the confounding of the fiber by the high-pressure stream will become firm, it is desirable. Of course, the first fiber layer may consist of only thermal-contraction nature fiber or potential crimp nature fiber.
[0033] When carrying out the thermal contraction of the first fiber layer, although the modes of the first fiber layer may be any, such as a parallel web which consists of staple fiber, a cross web, a semi random web, and a random web, heights are uniformly

formed in the second fiber layer for the way which, on the other hand, centralizes the direction of the thermal contraction of a fiber layer on **. Therefore, as for the first fiber layer, it is desirable that it is a parallel web. since [moreover,] confounding processing of the first fiber layer and the second fiber layer is partially performed in this invention so that it may mention later -- portions other than the confounding section -- setting -- the fiber in the first fiber layer -- beforehand -- a confounding -- or it is necessary to make it join Therefore, after performing confounding processing by the high-pressure stream etc. to the first fiber layer beforehand and making this into the state of a nonwoven fabric, it is desirable to perform confounding processing between the fiber layers mentioned later.

[0034] The eyes of the first fiber layer are 5 g/m2. It is desirable that it is above. 5 g/m2 It is because it is difficult in the following to create a uniform fiber layer. more -- desirable -- 10 - 40 g/m2 it is . The first fiber layer and the second fiber layer are unified by the confounding of fiber. Although a confounding has the method of making the method covering the whole surface or the confounding section of a fiber layer in the shape of a line by the high-pressure pillar-shaped stream, when the confounding section is made on the whole surface, since it is lost, the thing which the fiber which contributes to the engagement section of the second fiber layer likes and for which the confounding section is made in the shape of a line is desirable.

[0035] namely, the state where the confounding section (1) is formed in the shape of a stripe, and between the first fiber layer (2) and the second fiber layers (3) has not carried out the confounding of the confounding section substantially in the other portion like drawing 5 and drawing 6 -- it is -- the second fiber layer -- a ridge -- section (4) formation is carried out

[0036] The method of injecting a high-pressure stream is mentioned from the nozzle with which the orifice of 0.05-0.5mm of apertures set the fixed interval to the layered product which consists of the first fiber layer and the second fiber layer, and was drilled in the width direction as a method of making the confounding section of the shape of this line forming. Since the portion to which a stream collides with a processed material is restricted very in part according to this method, "spilling" of fiber can be suppressed so much and both the fiber layer can be made to unify in the uniform state. The interval of an orifice turns into an interval of the confounding section as it is here. However, this interval needs to care about a bird clapper narrowly by the thermal contraction of the next first fiber layer. As for the interval of an orifice, i.e., the interval of the confounding section, in this invention, it is desirable that it is 0.5-15mm. When making the confounding section into the shape of a line, it does not change with having injected the stream all over the nonwoven fabric substantially at intervals of [of less than 2mm] the orifice, but it becomes impossible to disregard "spilling" of fiber. Moreover, if it exceeds 15mm, since the rate of the confounding section occupied in fixed area will become small too much and it will become inadequate unifying it between both fiber layers, it is not desirable. It is 3-10mm more preferably.

[0037] Moreover, since the area which the confounding section occupies is small when performing high-pressure stream processing by this method, it is good to set up water pressure more highly a little and to strengthen a confounding rather than the case where a stream is injected all over a processed material. Specifically, it is 60 kg/cm2. It is desirable that it is above. more -- desirable -- 80 - 180 kg/cm2 it is .

[0038] When the first fiber layer carries out a thermal contraction, it heat-treats to this unified laminating nonwoven fabric, the first fiber layer is shrunk, and irregularity is made to form in the second fiber layer of portions other than the confounding section. it is made to overfeed in the length direction of a nonwoven fabric at the time of heat-treatment at this time, and is shown in drawing 7 and drawing 8 -- as -- a ridge -- much heights (5) which make straight side the direction which intersects perpendicularly with the section (4) are formed As for things, in the above-mentioned case, it is [the lengthwise contraction of the first fiber layer] desirable that it is 10 - 80%. At less than 10%, when formation of a ridge is inadequate, and sufficient loft for a nonwoven fabric cannot be given and it uses as field fastener female material, since there are few heights, the engagement force becomes inadequate. Although the number of the ridges formed increases so that a contraction becomes large, even if fiber density will become high and tactile feeling will become hard, if it is made to contract 80% or more, and it uses this as field fastener female material, since it does not change but the increase of thickness and flexibility become bad rather, the engagement force is not desirable.

[0039] Moreover, as for the contraction of the longitudinal direction of the first fiber layer, it is desirable that it is about 2 - 60%. a fine ridge which was mentioned above between the confounding sections when the lateral contraction became large not much -- it is because the heights of a ** become are hard to be formed

[0040] In order to enlarge a lengthwise contraction and to press down a lateral contraction, it is good to use the nonwoven fabric which consists of a parallel web which the great portion of composition fiber arranged to lengthwise as the first fiber layer.

[0041] The thermal-contraction nature fiber in the first fiber layer or potential crimp nature fiber performs heat-treatment at a thermal contraction or the temperature which carries out a crimp. Specifically, a hot blast penetration type dryer can perform. In this case, the rate of a thermal contraction is determined by temperature and the residence time. For example, what is necessary is to make heating temperature (T degrees C) into within the limits of $100<T<Tm+30$, and just to give heat-treatment for 10 seconds - 1 minute at this temperature, in using the fiber which consists of an ethylene-propylene random copolymer mentioned above as thermal-contraction nature fiber. Since fiber will fuse completely and contraction stress will decline remarkably if less than 100 degrees C of a thermal contraction are [heating temperature] insufficient and it exceeds Tm+30 degree C, it is not desirable.

[0042] thus, the ridge where the confounding section exists in the shape of a line, and the nonwoven fabric of this invention obtained makes the longitudinal direction of a nonwoven fabric straight side between the confounding sections -- much heights of a ** are formed and a ridge -- since the flexibility of fiber is comparatively high in the heights of a **, it has the advantage of the whole nonwoven fabric being very soft, and being very easy to engage with the engagement section of field fastener male material Moreover, since there are few rates for which the confounding section accounts, even if it is low eyes, it is uniform, and the

nonwoven fabric which presents the outstanding appearance can be obtained.
[0043]
[Example] Hereafter, an example is given and the content of this invention is explained concretely. in addition, the obtained field fastener performance (the numerousness of fluffs and ablation -- powerful) was measured by the following methods
[0044] The number of times one or more fiber edges (7) are found in [of number of times] the ridgeline partial (6) upper 25.5mm width of a fold as it is shown in drawing 10 , when applying the fiber magnifying glass (8) which makes a table the engagement aspect of the field fastener female material of the second fiber layer, makes it double fold in arbitrary parts as shown in numerousness drawing 9 of a fluff, and has the frame of 25.5mm around in the ridgeline portion (6) of a fold 10 times and observing The field fastener female material of this invention says a thing observable 5 times or more.
[0045] The mushroom type hook section with an ablation powerful height of about 0.5mm is 2 1cm. It went and came back to field fastener male material with a width-of-face 3cm length of 8cm prepared per about 200 one with the roller with a weight of 1kg on the field fastener female material of this invention, and pasted up. Subsequently, 4cm (a total of 8cm of male material and female material) of edges was removed, it divided in the 180 angle direction in a top and the bottom, and while it was engaged exfoliated about 3cm in a part for 30cm/in speed using the tensilon made from Cage En Tech. and the six maximum points from a graph -- very -- six dots -- reading -- the average -- ablation -- it was presupposed that it is powerful (gf / 3cm)
[0046] [Example] -- the first fiber layer and the second fiber layer were prepared as follows
50% (2 deniers, 51mm) of bicomponent fibers of the first fiber layer polyethylene (sheath) polypropylene (heart) and 50% (2 deniers, 51mm) of dissolution peak temperature (Tm)136 degree C ethylene-propylene random-copolymer fiber are mixed, and it is 20 g/m2. The web was created. Subsequently, it is water pressure 50 kg/cm2 to this web. The high-pressure pillar-shaped stream was injected, the confounding of the fiber was carried out, it was made the nonwoven fabric, and this was made into the first fiber layer.
Second fiber layer polypropylene span bond nonwoven fabric PPSB(Asahi Chemical Industry Co., Ltd. make)15 g/m2 It widened to the longitudinal direction by the tenter, and considered as the nonwoven fabric of the eyes of I, RO, and three kinds of HA. each eyes (g/m2) -- and -- being powerful (kg / 5cm) -- it was as following

目付		強力 MD	CD
初期	15.0	2.7	0.6
イ	13.3	2.5	0.5
ロ	12.0	1.8	0.4
ハ	10.7	0.9	0.3

[0047] The two unification above-mentioned fiber layers of the first fiber layer and the second fiber layer are piled up, and it is water pressure 60 kg/cm2 from the second fiber layer side. The high-pressure pillar-shaped style was respectively injected like the next, and field fastener female material was created. **.
A Inject on the whole surface by part for 8m/of traverse speed of a nonwoven fabric (field fastener female material shown in the perspective diagram of drawing 1 , and the cross section of drawing 2).
B Inject to a line in 5mm pitch by part for 4m/of traverse speed of a nonwoven fabric (field fastener female material shown in the perspective diagram of drawing 5 , and the cross section of drawing 6).
[0048] hot blast processing of the field fastener female material created by the method of the thermal-contraction processing above A and B is carried out by 135 degrees C, and 8.6m overfeeding of part twice [about] for /of traverse speed of a conveyer, and field contraction of the first fiber layer is carried out by shrinking ethylene-propylene random-copolymer fiber -- making -- a ridge small in the second fiber layer -- much heights of a ** were formed what heat-treated the field fastener female material by Above A as shown in the perspective diagram of drawing 3 , and the cross section of drawing 4 -- the crosswise ridge where a long side is small -- much sections were formed in the whole surface what heat-treated the field fastener female material by Above B as shown in the perspective diagram of drawing 7 , and the cross section of drawing 8 -- crosswise heights with a small long side -- a ridge -- a large number were formed on the surface of the section
[0049] The example of comparison was compared for what did not widen the performance span bond nonwoven fabric of field fastener female material, but was used for the second fiber layer with the first stage, and the performance was compared for what was widened and was used for the second fiber layer as an example of this invention.
the second fiber layer The method of unification Thermal-contraction processing The number of times of fluff discovery exfoliation -- powerful The first stage A Nothing 0 30 First stage A It is. 0 33 First stage B Nothing 1 75 First stage B It is. 1 71 I A Nothing 8 105 I A Be. 8 110 I B Make. 8 117 IB It is. 8 124 RO A Make. 9 133 ROA It is. 10 144 RO B Make. 10 140 ROB It is. 10 136 HA A Make. 10 166 HA A **** 10 170 HA B Nothing 10 230 HA B **** 10 227 [0050]
[Effect of the Invention] The span bond nonwoven fabric was widened as above-mentioned, it considered as the second fiber layer, and each field fastener female material of this invention used for the engagement section showed 100 or more high engagement force. On the other hand, the field fastener female material of the example of comparison which made the span bond nonwoven fabric the engagement section as it was was a result with about about 35% of low engagement force. This field fastener female material is especially used for disposable goods, such as a disposable diaper, preferably.

[Translation done.]